

**1. General information****Course:** PRINCIPLES OF FOOD SCIENCE AND TECHNOLOGY**Type:** CORE COURSE**Degree:** 383 - UNDERGRADUATE DEGREE PROGRAMME IN FOOD SCIENCE AND TECHNOLOGY**Center:** 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY**Year:** 1**Main language:** Spanish**Use of additional languages:****Web site:** campusvirtual.uclm.es**Code:** 58304**ECTS credits:** 6**Academic year:** 2023-24**Group(s):** 22**Duration:** First semester**Second language:****English Friendly:** Y**Bilingual:** N

Lecturer: FERNANDO DORADO FERNANDEZ - Group(s): 22				
Building/Office	Department	Phone number	Email	Office hours
Enrique Costa. Despacho 2	INGENIERÍA QUÍMICA	3516	fernando.dorado@uclm.es	M-Th from 13 to 14 h.
Lecturer: SERGIO GOMEZ ALONSO - Group(s): 22				
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IRICA/Primera planta	Q. ANALÍTICA Y TGIA. ALIMENTOS	926052829	sergio.gomez@uclm.es	Send an e-mail to arrange a day and time for the tutorial.
Lecturer: ESTER LÓPEZ FERNÁNDEZ - Group(s): 22				
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2. Pre-Requisites

No prerequisites

3. Justification in the curriculum, relation to other subjects and to the profession

Food science is the discipline in which the sciences of biology, chemistry, physics and engineering are used to study the nature of food, the causes of its deterioration, the principles that underlie the processing of food, food, and improving food for consumers. On the other hand, Food Technology is the application of Food Science to the selection, preservation, elaboration, packaging, distribution and use of safe, nutritious and healthy foods.

Foundations of Food Science and Technology (CTA) is a basic introductory subject to the scientific-technological discipline and professional competences of CTA. It begins the study of the principles of the complex and multidisciplinary socio-economic world related to food, food and food industries. The foundations of the properties of food, the preservation and processing of food products, the principles of food quality and safety management and the relationship between food, nutrition and human health are addressed, among others. .

On the other hand, food production and its preservation have been developed, for centuries, without knowledge of its action mechanisms. Currently, the food industry is characterized by a high degree of technological development, in which the basic operations of Chemical Engineering are applied in processes that, in most cases, are carried out on a large scale and with continuous processes of production. The knowledge related to these operations constitutes the formation of Food Engineering and Technology.

This part of the course aims to provide the student with the basic and applied knowledge on matter and energy balances, fluid flow and heat transmission, the basis for the design of basic operations in Food Engineering. This training is expanded and complemented with the subject "Basic Operations in the Food Industry", located in the first semester of the second year of the Degree.

4. Degree competences achieved in this course**Course competences**

Code	Description
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
E02	To acquire basic knowledge in biology, biochemistry, physiology and microbiology to allow the study of the nature of foods, causes of their alteration and fundamentals of their production, as well as their role in human nutrition and dietetics
E04	To know the basic fundamentals of instrumentation and process control in the food industry
E05	To know the composition, phyco-chemical properties, nutritional value and sensory properties of foods
E23	To acquire knowledge on culinary techniques, catering, nutrition and culture
G01	To develop the aptitude to gather and interpret information and data to issue critical judgments that include a reflection on relevant topics of social, scientific or ethical nature.
G02	To possess a correct oral and written communication. To transmit information, ideas, problems and solutions to a both specialized and not specialized public.
G03	To develop habits of excellence and quality in the professional exercise applying the fundamental human rights, the principles of equality of opportunities and the values of a culture of peace and democratic. Acquiring an ethical commitment and acting according to

the professional business ethics and the respect to the environment.

- G05 To understand and to use the English language, both written and spoken, applied to the area of the Food Science and Technology. (To be able to acquire this ability, a series of actions that will be specified in every module will be performed).
- G06 To dominate the Technologies of the Information and the Communication (TIC) to user's level, which allows to work in virtual spaces, Internet, electronic databases, as well as with common software packages (e.g. Microsoft Office).

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Introduce the student into the fundamentals of Food Technology

Enhance self-awareness of the importance of food-culture-society interaction

Acquire the basic terminology of the discipline and the fundamentals of quality management, food safety and the relationship between food and health

Know the professional competence of the future graduate in society

Introduce the student into the fundamentals of Food Science

Acquire knowledge and skills in the basic calculation of flux of fluid, heat transfer and mass transfer operations, and in the basic design of chemical reactors.

Additional outcomes

O1 - Explain and defend in writing and orally a practical case related to Food Science and Technology (CTA) [G1, G2, G3, G5] O2 - Use ICT [G6] O3 - Identify and describe the foundations of the CTA and food properties [E2, E4] O4 - Identify and apply the principles of food quality and safety management [E2, E5] O5 - Ground the relationship between food and health [E2, E5] O6 - Identify the professional skills of the future graduate in society [E2, E4, E5] O7 - Carry out material and energy balances of process flow diagrams related to Food Engineering [E4] O8 - Know the fundamental concepts related to Fluid Flow and Heat Transmission [E4] O9 - Identify the equipment used to drive liquids, flow measurement and heat exchange [E4] O10 - Understand the main mechanisms of matter transfer, diffusion and convection [E4] O11 - Know the basic principles of the design of reactors and processes in the Food Industry [E4] O12 - Base the interaction between food, culture and society [E23]

6. Units / Contents

Unit 1: Unit 1 (3 ECTS)

Unit 1.1 General concepts of Food Science and Technology (CTA). [O3]

Unit 1.2 Historical evolution of the CTA and the food sector. [O3]

Unit 1.3 Relationship between food, culture and society. [O12]

Unit 1.4 Training in CTA: methodologies and teaching resources. [O3, O6]

Unit 1.5 Introduction to food and its properties (Food Science). [O3]

Unit 1.6 Foundations of food preservation and processing (Technology, Biotechnology and Food Industries). [O3]

Unit 1.7 Principles of food quality and safety management. [O4]

Unit 1.8 Introduction to the relationship between food, nutrition and health. [O12]

Unit 1.9 Professional competences of the CTA graduate in society. [O6]

Unit 2: Unit 2 (3 ECTS)

Unit 2.1 General concepts of Chemical Engineering and the Food Industry: Food Engineering [O1, O2, O3].

Unit 2.2 Conservation laws for extensive properties [O3, O7].

Unit 2.3 Introduction to fluid flow [O3, O8, O9].

Unit 2.4 Introduction to heat transport [O3, O8, O9].

Unit 2.5 Introduction to the transfer of matter [O3, O10].

Unit 2.6 Basic calculation of reactors and processes in the food industry [O3, O11].

Unit 3: Problem solving and activities

Unit 4: Elaboration of group work

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures		1.6	40	Y	N	
Workshops or seminars [ON-SITE]	Workshops and Seminars		0.4	10	Y	N	
Group tutoring sessions [ON-SITE]	Group tutoring sessions		0.2	5	Y	Y	
Writing of reports or projects [OFF-SITE]	Cooperative / Collaborative Learning		2.8	70	Y	Y	
Study and Exam Preparation [OFF-SITE]	Self-study		0.8	20	Y	N	
Formative Assessment [ON-SITE]	Assessment tests		0.2	5	Y	N	
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Test	60.00%	60.00%	
Theoretical papers assessment	25.00%	25.00%	

Assessment of problem solving and/or case studies	Total:	15.00%	15.00%
		100.00%	100.00%

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

Unit 1 and Unit 2 are evaluated independently and therefore, to pass the subject, a grade equal to or greater than 4 out of 10 must be achieved in each of them and their average is equal to or greater than 5 out of 10. If in the ordinary call the student obtains a grade equal to or greater than 5 out of 10 in one unit but obtains a grade less than 4/10 in the other or the average of the grades of both units is less than 5 out of 10, the subject will be suspended, but the grade for the approved unit will be kept until the extraordinary call.

Non-continuous evaluation:

Unit 1 and Unit 2 are evaluated independently and therefore, to pass the subject, a grade equal to or greater than 4 out of 10 must be achieved in each of them and their average is equal to or greater than 5 out of 10. If in the ordinary call the student obtains a grade equal to or greater than 5 out of 10 in one unit but obtains a grade less than 4/10 in the other or the average of the grades of both units is less than 5 out of 10, the subject will be suspended, but the grade for the approved unit will be kept until the extraordinary call.

Specifications for the resit/retake exam:

Students will only have to take a compulsory examination of the unit or units in which they have achieved a grade lower than 4 out of 10 in the ordinary call. But they must bear in mind that the average of the qualifications of both units must be equal to or greater than 5 out of 10 to pass the subject.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
AUGADO, José; CALLES, José Antonio; Cañizares, Pablo; López, Baldomero; Rodríguez, Francisco; Santos, Aurora; Serrano, David	INGENIERÍA DE LA INDUSTRIA ALIMENTARIA	Síntesis			1999	
Fellows, Peter	Tecnología del procesado de los alimentos : principios y prá	Acribia		978-84-200-1093-9	2007	
Fennema, Owen R.	Química de los alimentos	Acribia		84-200-0914-8	2000	
Gaman PM, Sherrington KB.	THE SCIENCE OF FOOD., 4th ed.	Butterworth-Heineman			1996	
TOLEDO, Romeo T.	FUNDAMENTALS OF FOOD PROCESS ENGINEERING	Chapman & Hall			1994	
de Vaclavik, Vickie A.	FUNDAMENTOS DE CIENCIA DE LOS ALIMENTOS	Acribia			2002	